Abstract

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Title: Kinematic Analysis of Gait in Patients with Hip Osteoarthrosis

Objectives: The aim of this thesis was to analyse the gait patterns in probands with Stage III osteoarthritis of the hip joint, to compare these patterns with published norms and to confirm a set of pre-established hypotheses.

Method: The thesis was designed as a case study, the purpose of which was to observe changes in the pelvis and trunk extension during gait, associated with significant degenerative changes in the hip joint. A total of 9 probands with Stage III osteoarthritis of the hip joint (6 females, 3 males) took part in the study. A complete physiotherapy assessment was carried out as part of the study. The temporal gait parameters were used to measure the probands' walking speed and relative stance phase duration. The following variables were measured in the frontal plane: lateral displacement of the pelvis and trunk toward the stance limb (cm) and pelvic obliquity toward the swing limb (degrees). A 3D motion analysis and evaluation of kinematic parameters were carried out using the Qualisys motion capture system device consisting of 6 infrared cameras. Gait was measured at different walking speeds during a 10-second time frame and the data was subsequently subtracted from a minimum of 5 gait cycles. For the comparison of the collected data, the subjectively most comfortable gait speed was selected for each patient. The data was analysed using the Qualisys Track Manager software and further processed in Microsoft Excel.

Results: The measurements showed that the gait patterns of probands with Stage III osteoarthritis of the hip joint are significantly different from the norms; however, they do not differ across all parameters. The walking speed of our probands was comparable to the results of other studies that analysed gait patterns of patients with late stages of hip osteoarthrosis and it was slower compared to healthy individuals of the same age category. A shorter stance phase duration on the affected lower limb, compared to the contralateral lower limb, was only found in 1/3 of our probands. The analysis of kinematic parameters did not show the hypothesised increase in pelvic drop toward the swing leg. Increased lateral displacement of pelvis and trunk was confirmed in the majority of our probands.

Keywords: Gait, Hip Osteoarthritis, Pelvis, Trunk, 3D Kinematic Analysis, Qualisys